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Perspectives of Sustainability
A Cross-Disciplinary Conference

Case study : Yorkshire Sculpture Park : Underground Gallery
Architects : Feilden Clegg Bradley Studios



Ben Elliott : Senior Lecturer in Architecture : Northumbria University

This presentation will use the Underground Gallery at the Yorkshire Sculpture Park as a case study. The study does not set out the project as a sustainable exemplar, but offers some insight into complex design considerations.

There is often a tendency to concentrate our sustainable agenda on the superficial issue of running costs of buildings, whereas whole building life cycle is really the only way to provide an accurate picture of sustainability.

These issues include construction, transportation, systems running costs, maintenance, life span, demolition/ deconstruction, reuse/ recycling, the embodied energy of materials and crucially, the importance of **design quality** as an impact on building life span.

We have all experienced architecture that lifts the spirit. Buildings that seem natural and comfortable in their context. Spaces that offer sanctuary, familiarity, peace.

Architecture is more than simply building, and it is these treasured places that are lovingly retained for generations.....

Sustainable can often be used by weaker practitioners as a justification for design which may be lacking in intellectual rigour and sophistication.

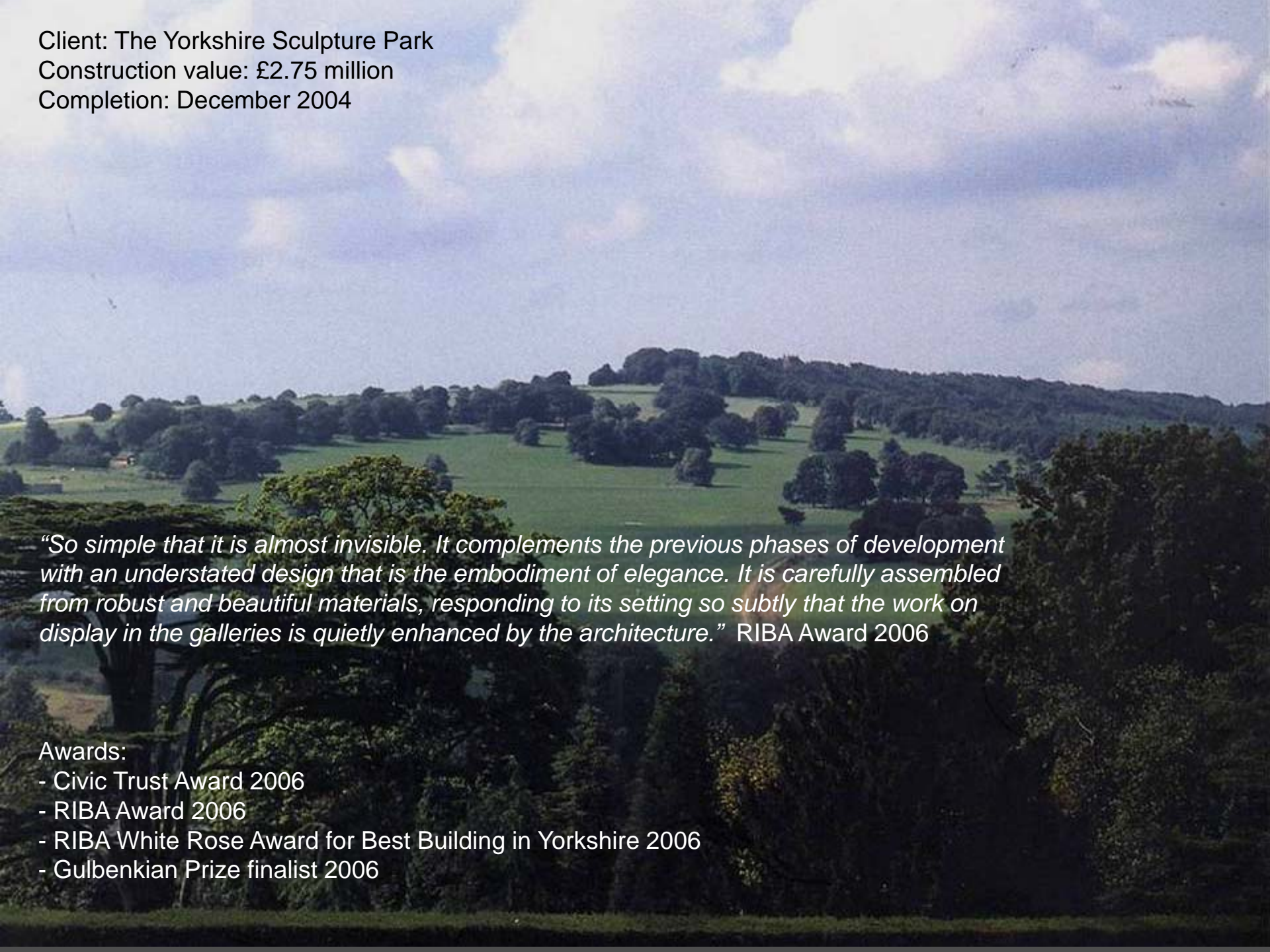
In truth aspects of sustainability are important, inherent design considerations which may serve to strengthen the quality of a scheme.

Technology should always be subservient to understanding of design principles, which should inherently encompass aspects of sustainability. A starting point of natural ventilation and lighting should be used where particular conditions apply, for instance. It is of crucial importance to engage with the local climate rather than try to mitigate against it.

Designing with sensitivity to context is a mark of quality design. Routed in the cultural context the design forms a stronger and more direct relationship with those who encounter the building, this is part of the genius loci.....

sensitivity + appropriateness

Yorkshire Sculpture Park – Underground Gallery



Client: The Yorkshire Sculpture Park
Construction value: £2.75 million
Completion: December 2004

“So simple that it is almost invisible. It complements the previous phases of development with an understated design that is the embodiment of elegance. It is carefully assembled from robust and beautiful materials, responding to its setting so subtly that the work on display in the galleries is quietly enhanced by the architecture.” RIBA Award 2006

Awards:

- Civic Trust Award 2006
- RIBA Award 2006
- RIBA White Rose Award for Best Building in Yorkshire 2006
- Gulbenkian Prize finalist 2006

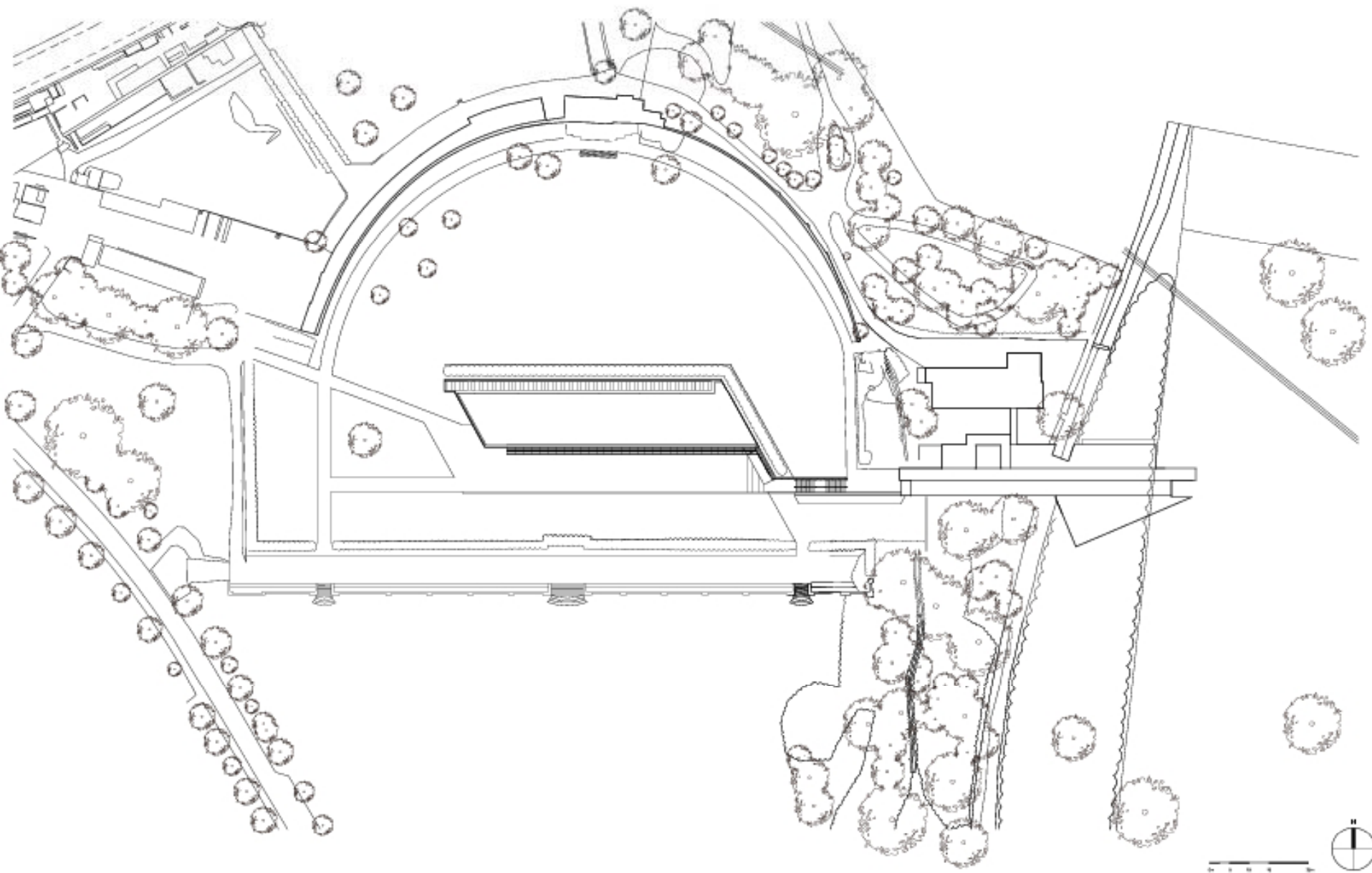


Early site model

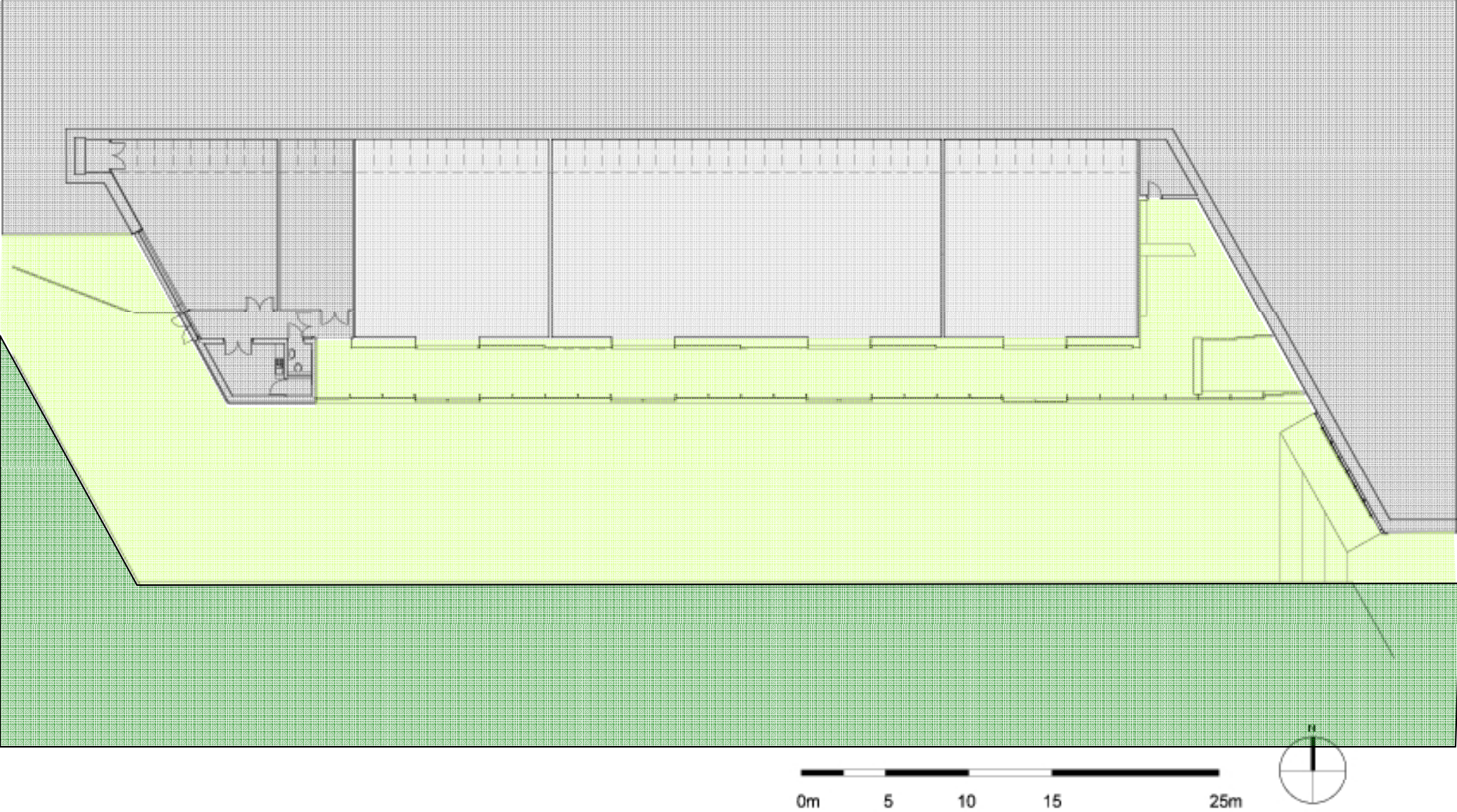




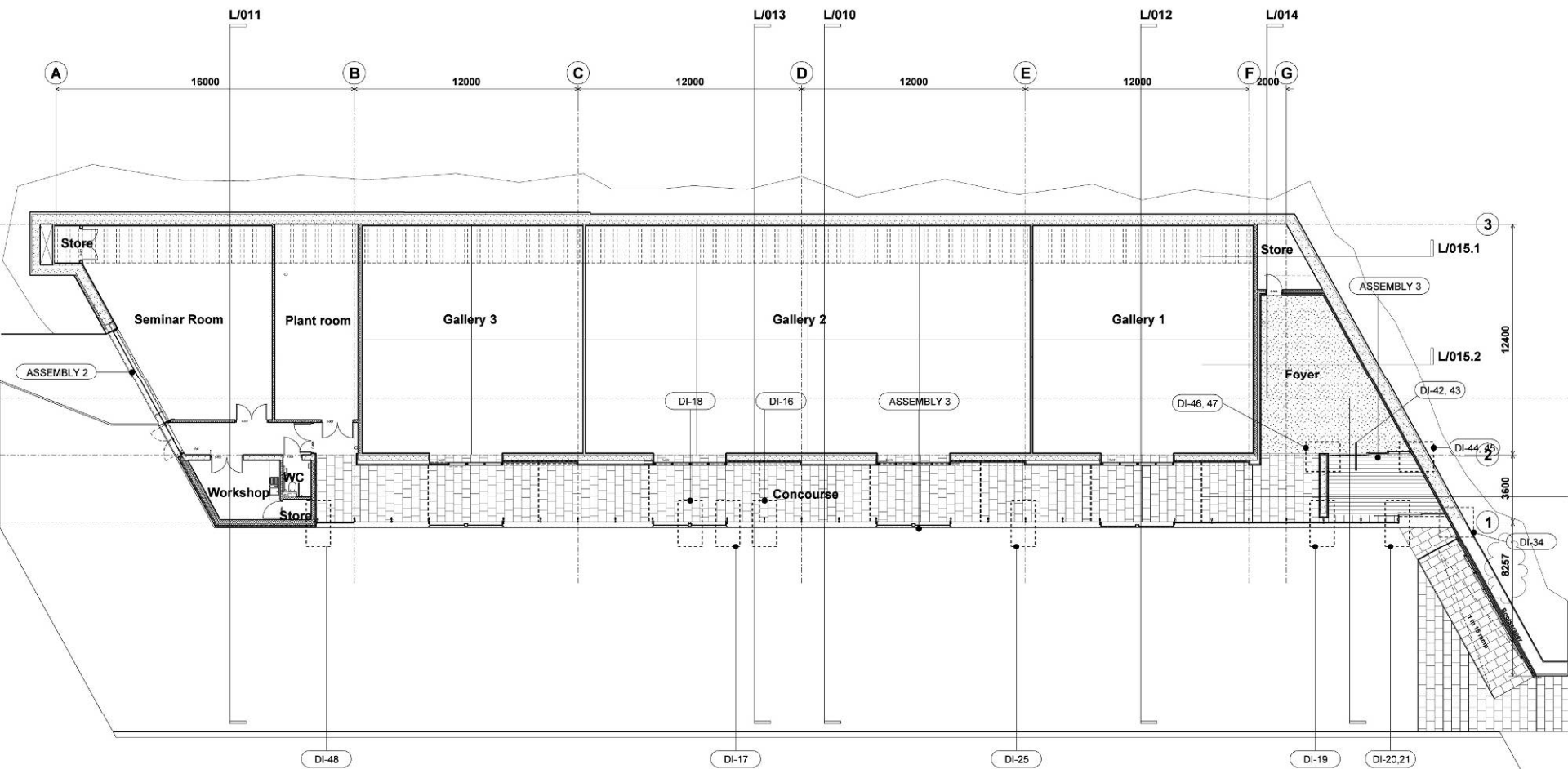
Existing visitor centre



Site plan



Plan – adjacent garden space

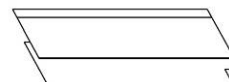


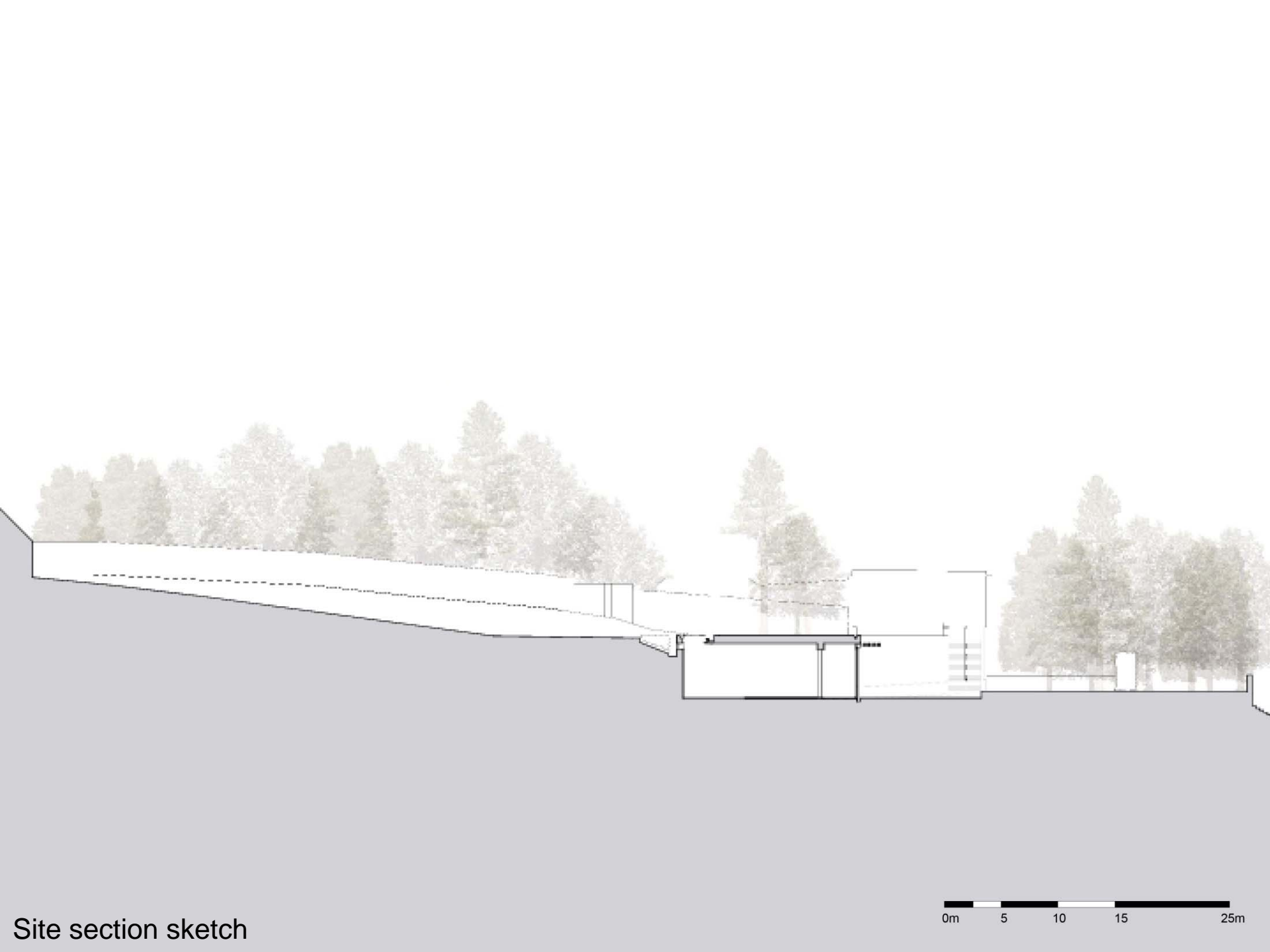
F - AS BUILT ISSUE
 E - General revisions. Detail added to curtain walling & west elevation on openings. Minor revisions to corridor openings. Detail reference added.
 D - South retaining wall, entrance ramp and steps revised.
 C - South retaining wall amended in line with site measurements.
 B - Amended to Structural Engineer's Tender Drawings.
 A - TENDER ISSUE

18.11.04
 08.01.04
 11.11.03
 23.10.03
 18.08.03
 10.07.03

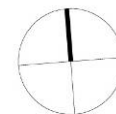
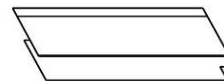
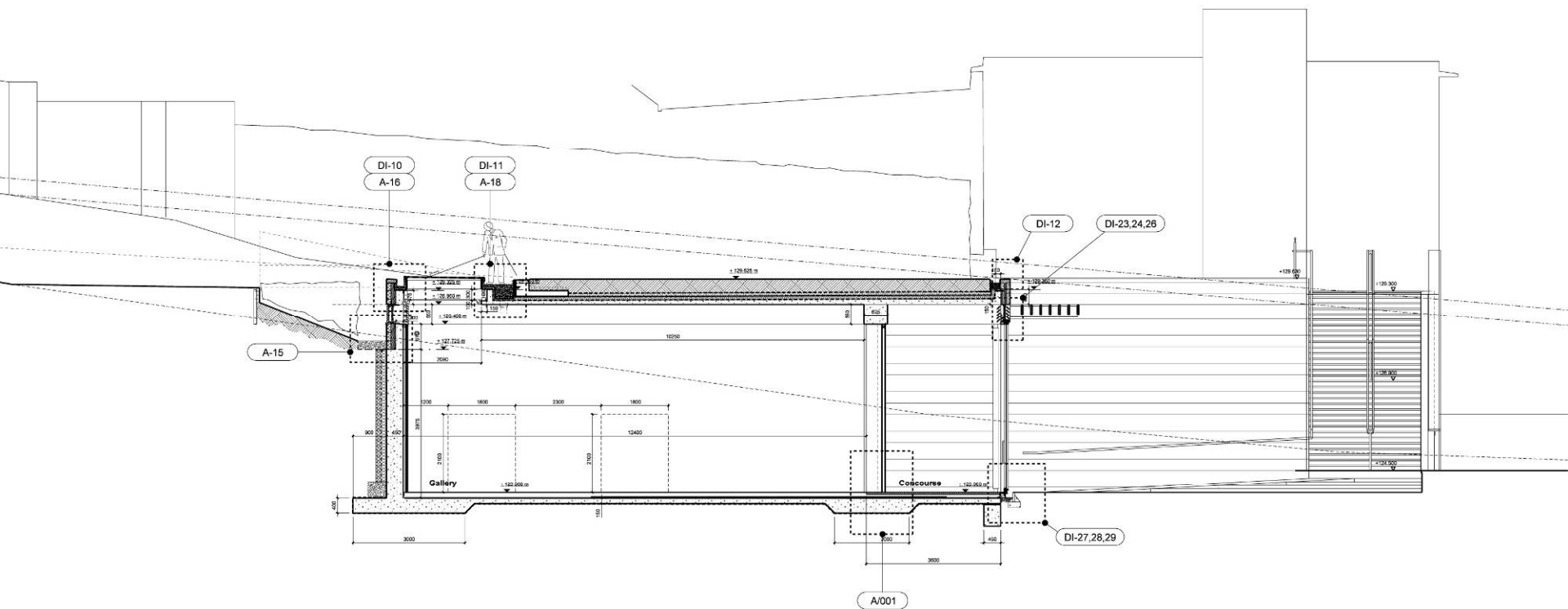
Amendment
 Date
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 1176/L/005 F
 Scale
 1:100 (1:200 @ A3)
 Date
 June 2003
 Drawn
 FCBA
 Do not scale
 All dimensions to be checked on site
 Original printed at A1

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Site section sketch

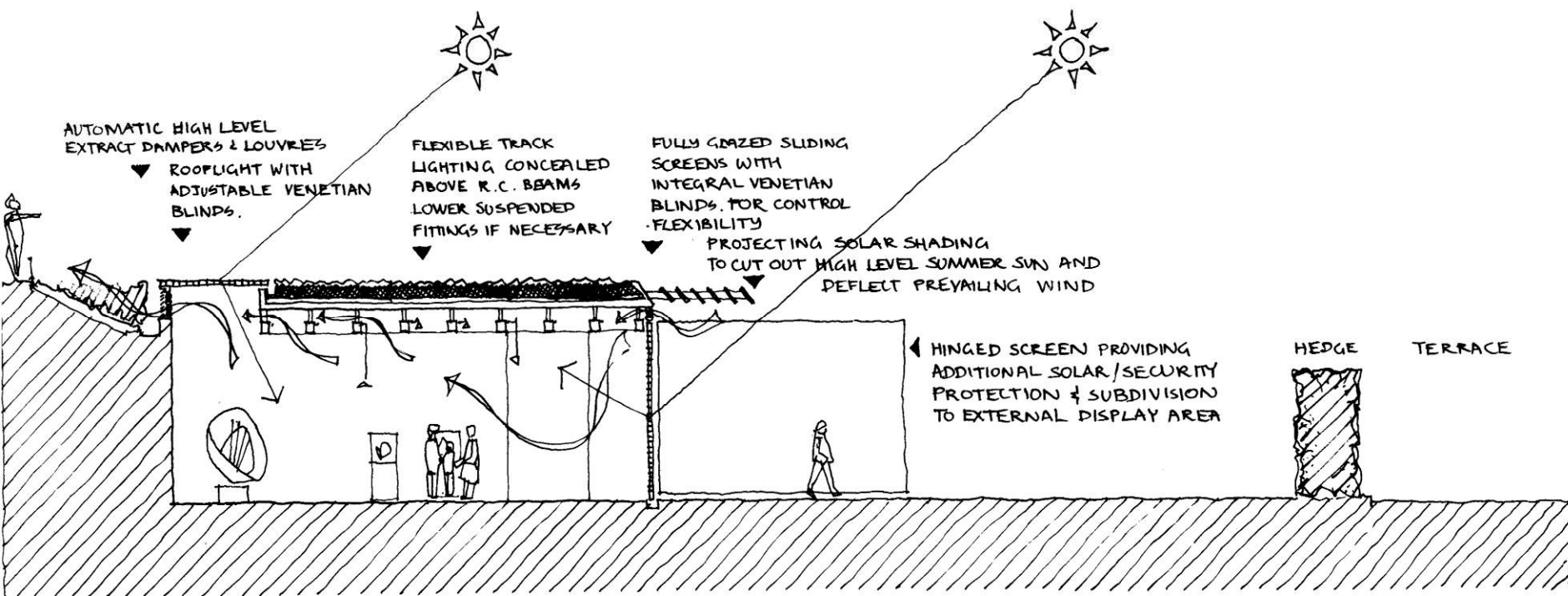


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F - AS BUILT ISSUE
E - Details developed & detail references added.
D - Gutter adjacent to rooftop widened after discussions with waterproofing manufacturer. Approach stair updated.
C - Level of concrete roof upstands amended.
B - Amended to Structural Engineer's Tender drawings and dimensions added.
A - TENDER ISSUE
Amendment Date

Job/Drawing No 1176/L/012 F
Amendment
Yorkshire Sculpture Park
Underground Gallery
Section through Door
Scale 1:50 (1:100 @ A3)
Date June 2003
Drawn GEFAS

Do not scale
All dimensions to be checked on site
Original printed at A1



INDOOR GALLERY : ENVIRONMENTAL CONSIDERATIONS

Earth sheltered/ green roof

Solar & thermal protection to roof membrane

Aesthetic enhancement of roof membrane

Improved rainwater attenuation

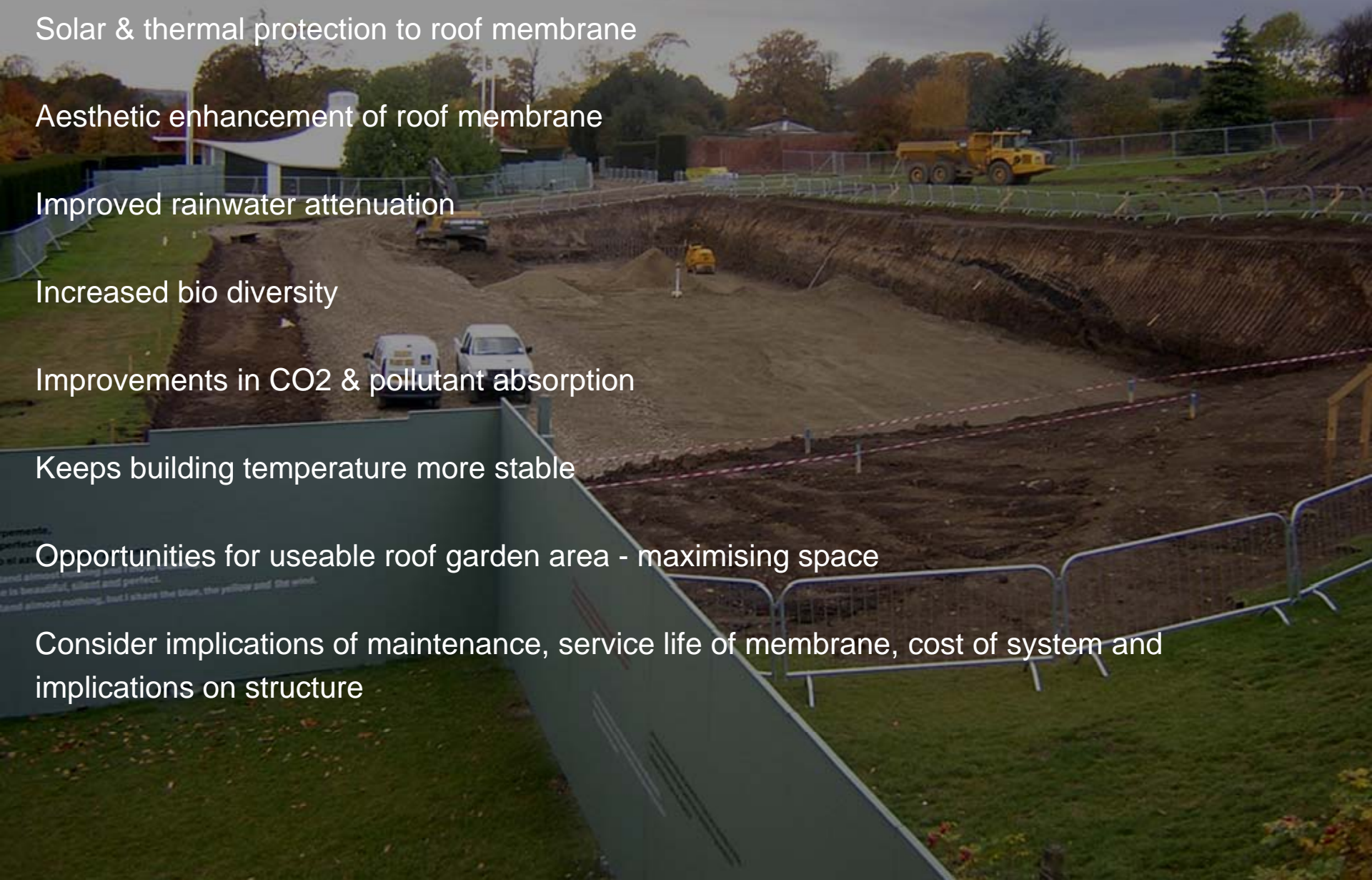
Increased bio diversity

Improvements in CO₂ & pollutant absorption

Keeps building temperature more stable

Opportunities for useable roof garden area - maximising space

Consider implications of maintenance, service life of membrane, cost of system and implications on structure





Initial excavations on site



Construction phase – topsoil in place – yet to be backfilled



Existing site



View of roof – continuation of landscape

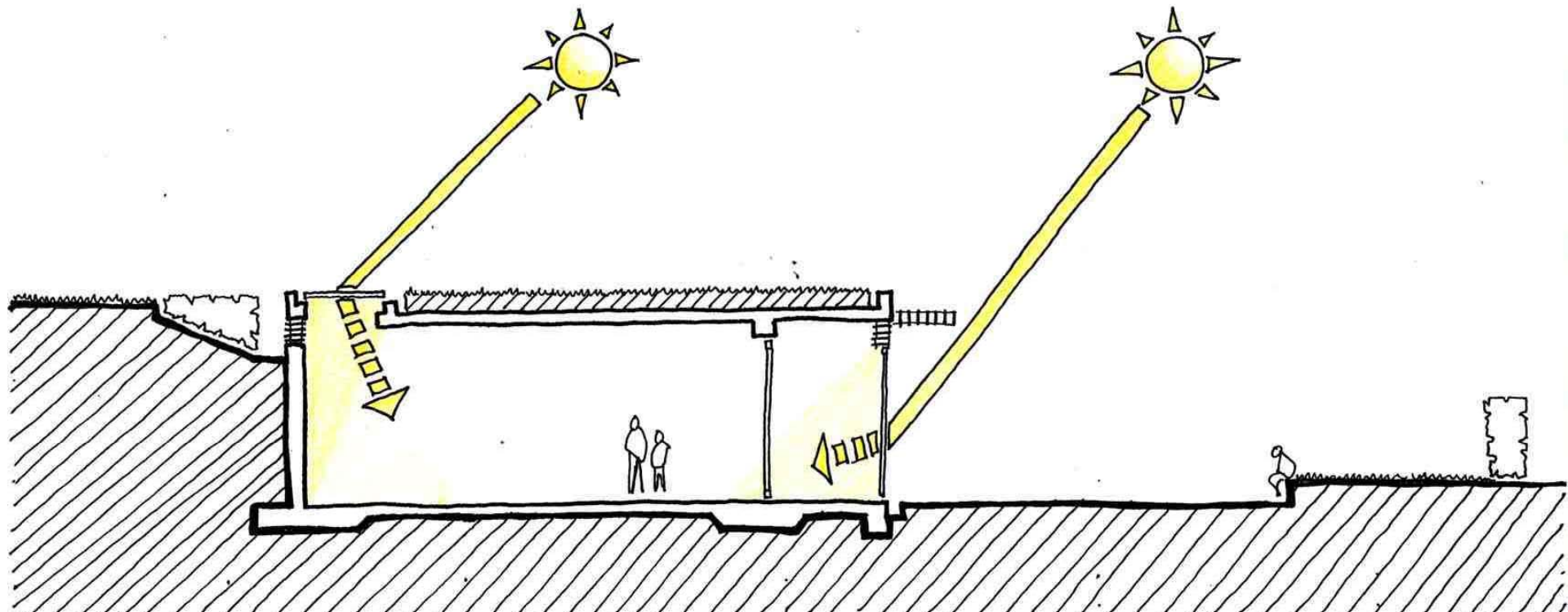
Natural Lighting

Large extent of south facing glazing to maximise solar gain

Controlled through use of louvres & circulation space as a buffer zone

Use of rooflights to gain natural light into galleries at back of building in a continuous strip to distribute daylight evenly

Glare from rooflights limited by use of opaque glazing & adjustable roller blinds





Solar control louvres



Solar control louvres



Solar control louvres

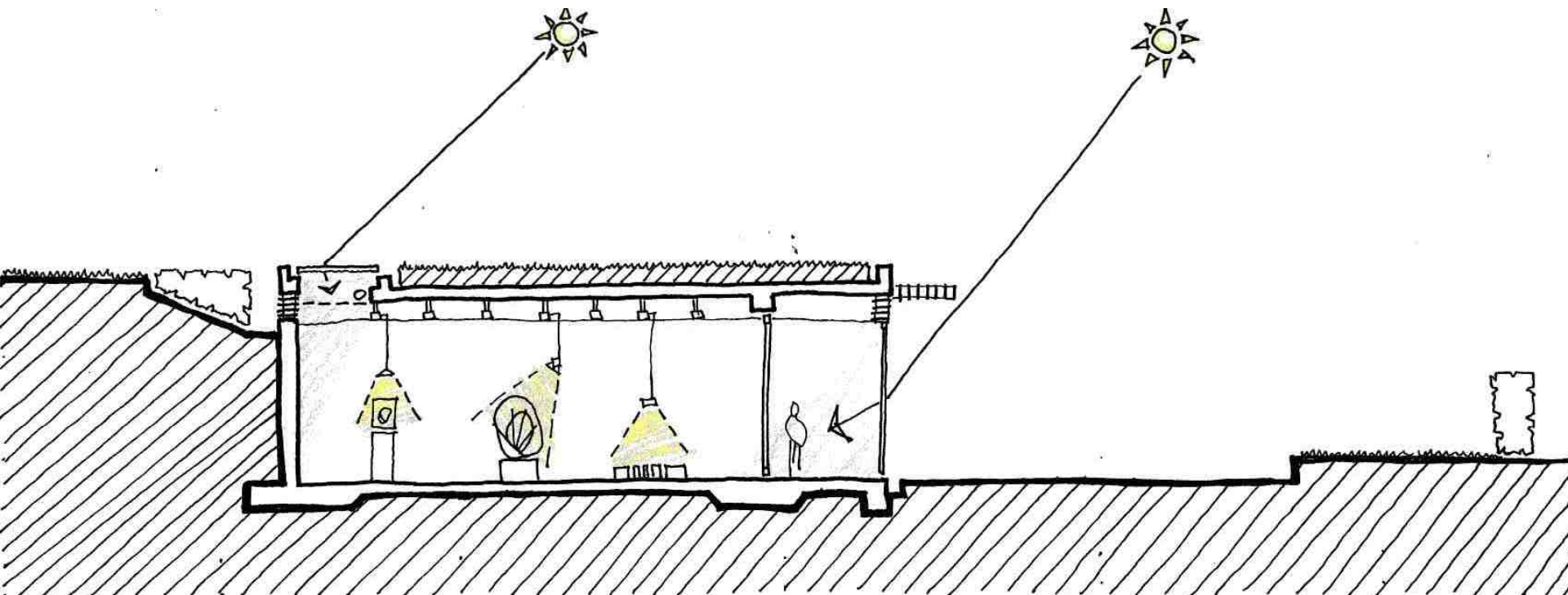


Rooflights – model study

Rooflights –under construction



Artificial lighting





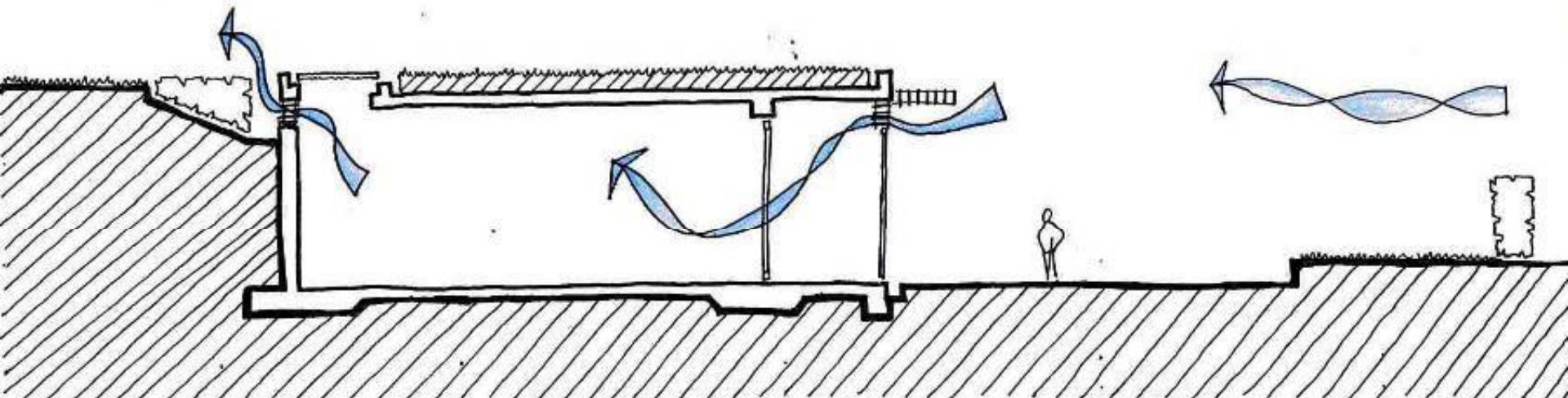
Artificial lighting - flexibility

Natural Ventilation

Internal temperatures cooled by movement of air through building

Cross ventilation enables deeper plan than single sided vents

Controlled through use of continuous automatic vent dampers along circulation space & back of galleries





louvred vents to gallery spaces



louvred vents to south façade

Thermal Mass

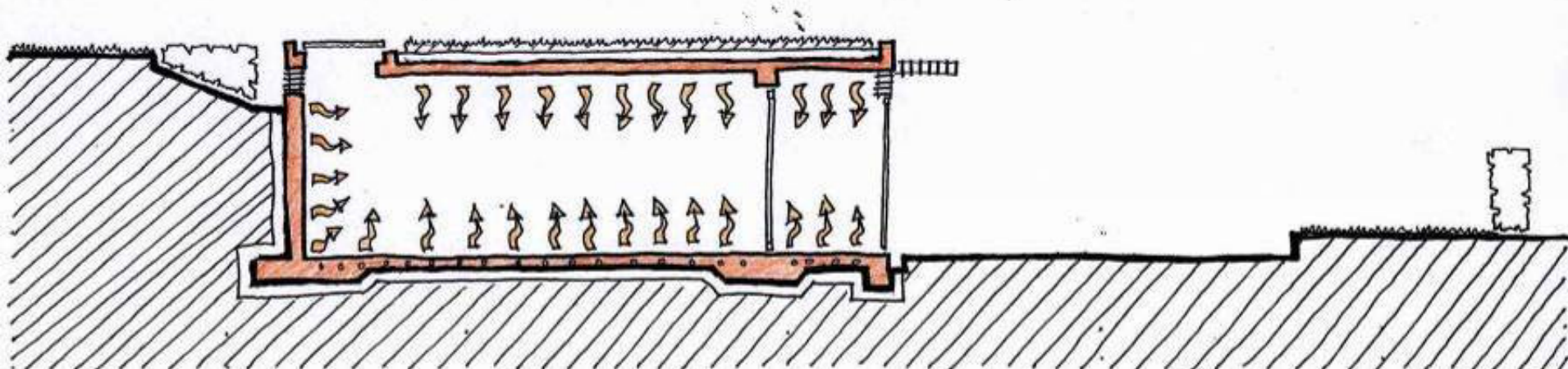
Insulation placed outside of heavy structural elements to maximise thermal mass

Mass helps to regulate temperatures for a more stable environment

Day/ night cycle particularly beneficial for summertime cooling

Exposed concrete floors & ceilings maximise effect

Works in combination with the natural ventilation









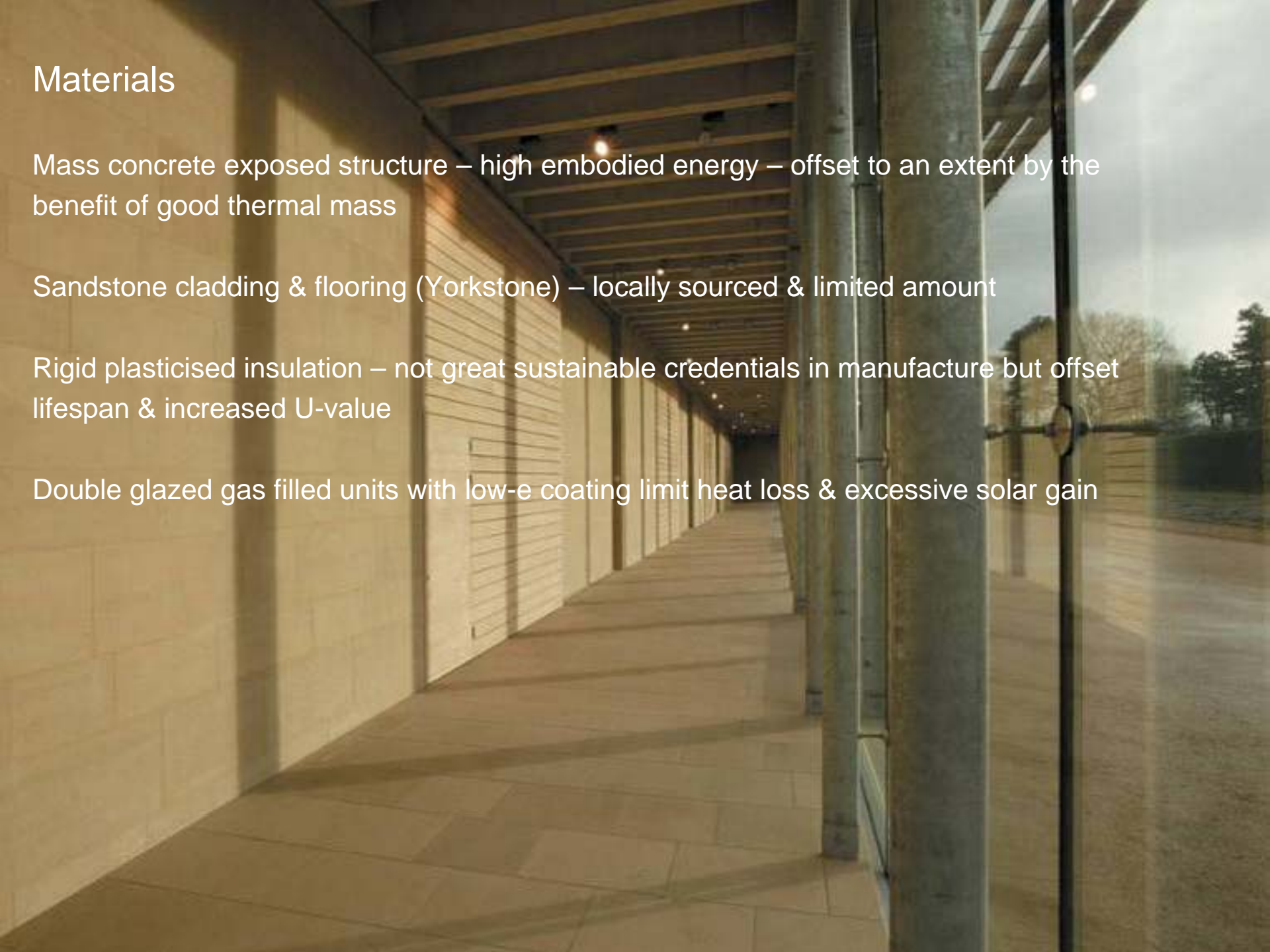
Materials

Mass concrete exposed structure – high embodied energy – offset to an extent by the benefit of good thermal mass

Sandstone cladding & flooring (Yorkstone) – locally sourced & limited amount

Rigid plasticised insulation – not great sustainable credentials in manufacture but offset lifespan & increased U-value

Double glazed gas filled units with low-e coating limit heat loss & excessive solar gain





Existing visitor centre – gallery continues material language

Acoustics

Natural ventilation can let in external noise – galleries are often intended to be quiet spaces – YSP benefits from very secluded rural site

Hard internal finishes create echoing internal environment – works well for galleries – generally limited occupancy





Hard materials visually softened by use of timber & natural light



Existing visitor centre interior– gallery continues spatial & material language



Existing visitor centre & bothy garden



Existing visitor centre with completed gallery in context



Gallery in context from east

Yorkshire Sculpture Park Underground Gallery
Architects: Feilden Clegg Bradley Architects LLP
Project Manager & Cost Consultant: Burnley Wilson Fish
Structural Engineer: WSP
M&E Engineer: Ernest Griffiths & Son
Planning Supervisor: Turner & Townsend
Landscape Consultant: Land Use Consultants
Façade Consultant: Montresor Partnership
Contractor: Quarmby Construction Company Ltd
Photographs: © Feilden Clegg Bradley Studios

